

ITRAC-3: 3th Training Course on Illicit Trafficking and Radiological Consequences

Karlsruhe, 13th May 2011

Using webGraph in Nucleonica

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webGraph in Nucleonica

Graphics module in Nucleonica:

- Easy to use
- Publication quality scientific graphics
- Save data and configuration as XML file
- Save graph in various formats (jpg, gif, png...)
- Often used in many other applications



1. webGraph overview
 1. Data input
 2. Graph settings
 3. Up- and download data files
 4. Download graph (Image format)
2. Exercise



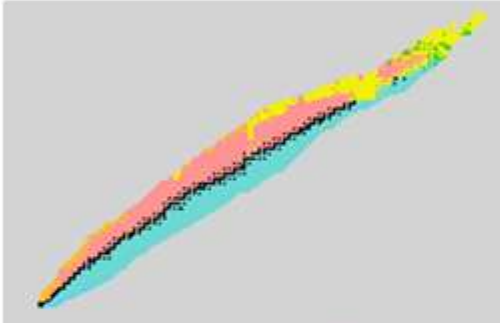
Go to webGraph

Logged in as: rdf Networking **Nuclear Science** Search Forum Calculator Privacy Legal Logout

nucleonica ... web driven nuclear science

Applications Data Knowledge My Preferences Help New Browser New Alerts

► Nuclide Explorer



» Actual Chart: Karlsruhe

► Search Nucleonica Documentation

Nuclear Data Retrieval

► Application Centre

- » Mass Activity Calculator
- » Decay Engine
- » Dosimetry & Shielding
- » Range & Stopping Power
- » webKORIGEN
- » Decay Engine for Large Nuclide Sets
- » Universal Nuclide Chart
- » Transport & Packaging
- » Nuclide mixtures
- » Nucleonica Scripting
- » Library creation for 3rd party software
- » Gamma Spectrum Generator
- » Gamma Spectrum Generator Pro
- » easy Monte Carlo
- » Cambio file Converter
- » WESPA
- » Gamma Library
- » **webGraph**

Welcome, F.Ray

[My Settings](#)
[Networking](#)

► My Last Nuclides

- 20 Ca40
- 19 K40
- 102 No259
- 10 Ne28
- 5 B13

► My Nuclide Mixtures

- My Uranium
- My U232+Co60 Mixture
- U232+Co60
- Decay of 1 Grams of 37 Rb 81 after 10 Hours
- Natural Uranium

► My Sources

► My Messages

webGraph: Data Input

Step 1: Data

Step 2: Graph

Step 3: Options

x,y
0,0,,
1,2,,
2,4,,
3,6,,
4,8,,
5,10,,
6,12,,
7,14,,
8,16,,
9,18,,

- Click *User defined*
- Enter your own graph data:
 - Header line (column title)
 - One *common* X-value column and
 - One Y-value column for each curve
 - Columns separated by Comma

Curve interpolation:

☒ Linear

☐ Polynomial

Graphs

☒ Simple Curve Sample

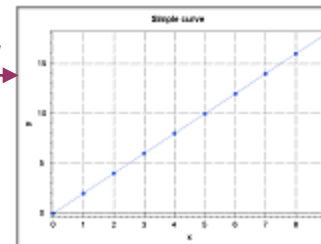
☐ Log Log Sample

☐ webGraph Logo

☐ Multiple Curves Sample

☐ User defined

preview



Show in Graph Tab

Please select an Excel data file:

Durchsuchen...

Upload Excel data file

Please select a configuration file:

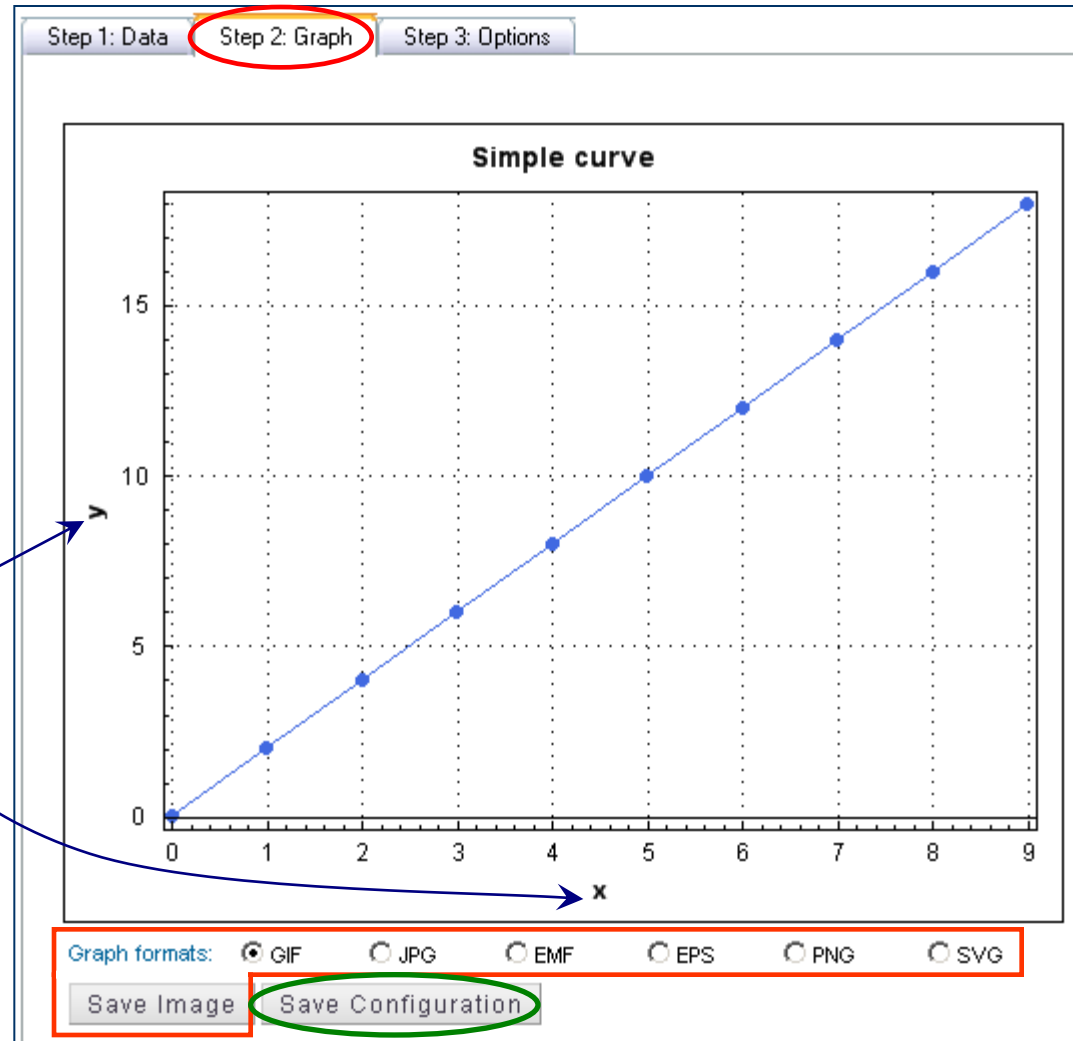
Durchsuchen...

Upload Configuration

- few data points or
- small error bars

webGraph: the resulting Graph

from the data
header line



webGraph: Image Formats

Graphic Formats used in Nucleonica:

- GIF: Graphic Interchange Format, for graphics with a maximum of 256 colors (8 bits per pixel). Lossless but low compression factor. Can store multiple images shown as animation by browsers.
- PNG: Portable Network Graphics, for color graphics with up to 48 bits/pixel. Lossless compression in general better than GIF.
- JPG: Joint Photographic Expert Group, for images and photos, good but not lossless compression involving decreasing quality with increasing compression factor.
- EMF: windows Enhanced Metafile Format, vector graphic for clipart and illustrations. Perfect for MS Office.
- EPS: Encapsulated PostScript File graphic format.
- SVG: Scalable Vector Graphics; requires Adobe SVG Viewer.

webGraph: Options

Default graph size from user Settings

Step 1: Data Step 2: Graph **Step 3: Options**

Titles

Graph Title:

Category (X):

Value (Y):

General Graph Settings

Image Width: Image Height:

Graph Style:

☒ Border

☒ Graph Border

☐ Show Legend

Curve Styles

Curve:

Curve name:

Symbol: Width (points=1/72")

Line Style:

Dash on:

Dash off:

Color: Opacity:

Axes

Axis Type Min Max

Y ☒ linear ☐ log ☒ Auto scale Y

X ☒ linear ☐ log ☒ Auto scale X

Gridlines and Ticks

Category (X) Axis Value (Y) Axis

☒ Major Gridlines ☐ Minor Gridlines ☒ Major Gridlines ☐ Minor Gridlines

Ticks Location: ☐ Outside scale ☒ Inside scale ☐ Through scale

Tick Steps:

X Axis: Major Step Minor Step

☒ Auto set steps

Y Axis: Major Step Minor Step

☒ Auto set steps

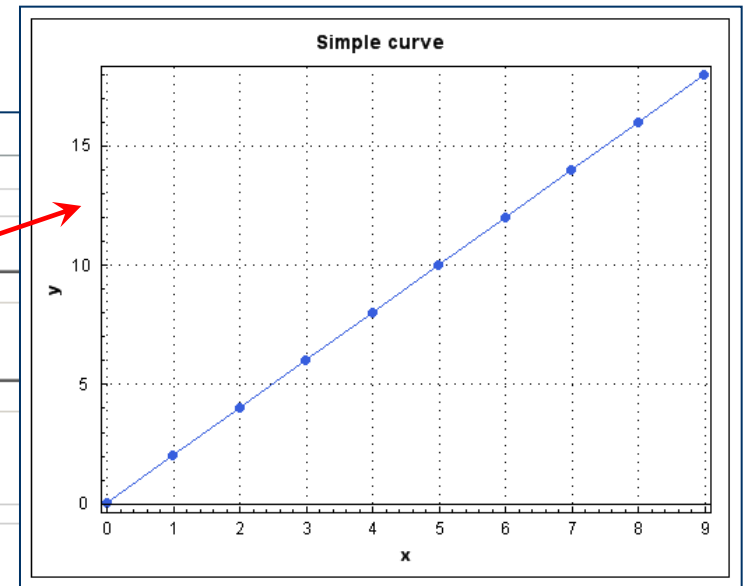
Legend

- filled Circle
- Square
- filled Square
- Diamond
- filled Diamond
- Triangle
- filled Triangle
- Triangle Down
- filled Triangle Down
- XCross
- Plus
- Star
- Horizontal Dash
- Vertical Dash
- Default
- None

Line Styles

- Solid
- Dash
- Dot
- Dash Dot
- Dash Dot Dot
- Custom (DashOn, DashOff)

Update Graph





webGraph

webGraph: Multiple Curves Sample

Questions, remarks, suggestions can be posted in the [forum](#)

Step 1: Data

Step 2: Graph

Step 3: Options

Independant curves with different x-values:

- 1 column pair (x,y) per curve
- Comma as column separator
- 1 empty column between 2 curves (empty comma pair)
- Header line:
 - X-axis title not used
 - Y-axis title as curve legend

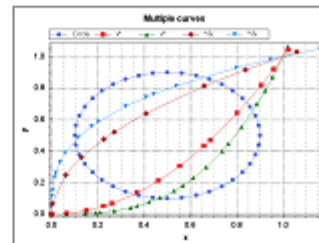
Circle, Circle,,	x, x ² ,,	x, x ³ ,,	x, ² √x,,	x, ³ √x,,
0.5000, 0.9000,,	0.000, 0.0000,,	0.000, 0.0000,,	0.000, 0.0000,,	0.000, 0.0000,,
0.5626, 0.8951,,	0.065, 0.0043,,	0.003, 0.0000,,	0.004, 0.0648,,	0.000, 0.0473,,
0.6236, 0.8804,,	0.150, 0.0225,,	0.066, 0.0003,,	0.061, 0.2466,,	0.001, 0.1128,,
0.6816, 0.8564,,	0.223, 0.0497,,	0.145, 0.0031,,	0.129, 0.3595,,	0.003, 0.1510,,
0.7351, 0.8236,,	0.260, 0.0677,,	0.190, 0.0069,,	0.225, 0.4747,,	0.012, 0.2310,,
0.7828, 0.7828,,	0.367, 0.1345,,	0.210, 0.0093,,	0.271, 0.5210,,	0.018, 0.2603,,
0.8236, 0.7351,,	0.459, 0.2108,,	0.270, 0.0197,,	0.407, 0.6383,,	0.036, 0.3298,,
0.8564, 0.6816,,	0.554, 0.3065,,	0.342, 0.0402,,	0.660, 0.8122,,	0.058, 0.3867,,
0.8804, 0.6236,,	0.658, 0.4330,,	0.369, 0.0501,,	0.838, 0.9154,,	0.115, 0.4857,,
0.8951, 0.5626,,	0.685, 0.4690,,	0.422, 0.0753,,	1.060, 1.0295,,	0.171, 0.5549,,
0.9000, 0.5000,,	0.801, 0.6414,,	0.469, 0.1030,,	, ,	0.202, 0.5868,,
0.8951, 0.4374,,	0.905, 0.8191,,	0.529, 0.1483,,	, ,	0.319, 0.6832,,
0.8804, 0.3764,,	0.960, 0.9212,,	0.567, 0.1818,,	, ,	0.408, 0.7418,,
0.8564, 0.3184,,	1.022, 1.0436,,	0.613, 0.2303,,	, ,	0.441, 0.7612,,
0.8236, 0.2649,,	, ,	0.667, 0.2972,,	, ,	0.537, 0.8127,,
0.7828, 0.2172,,	, ,	0.737, 0.4005,,	, ,	0.798, 0.9276,,
0.7351, 0.1764,,	, ,	0.764, 0.4458,,	, ,	0.945, 0.9814,,
0.6816, 0.1436,,	, ,	0.820, 0.5519,,	, ,	1.160, 1.0507,,

Curve interpolation:

- ☐ Linear
- ☒ Polynomial

Graphs

- ☐ Simple Curve Sample
- ☐ Log Log Sample
- ☐ webGraph Logo
- ☒ Multiple Curves Sample
- ☐ User defined



Show in Graph Tab

webGraph: Upload Excel Data

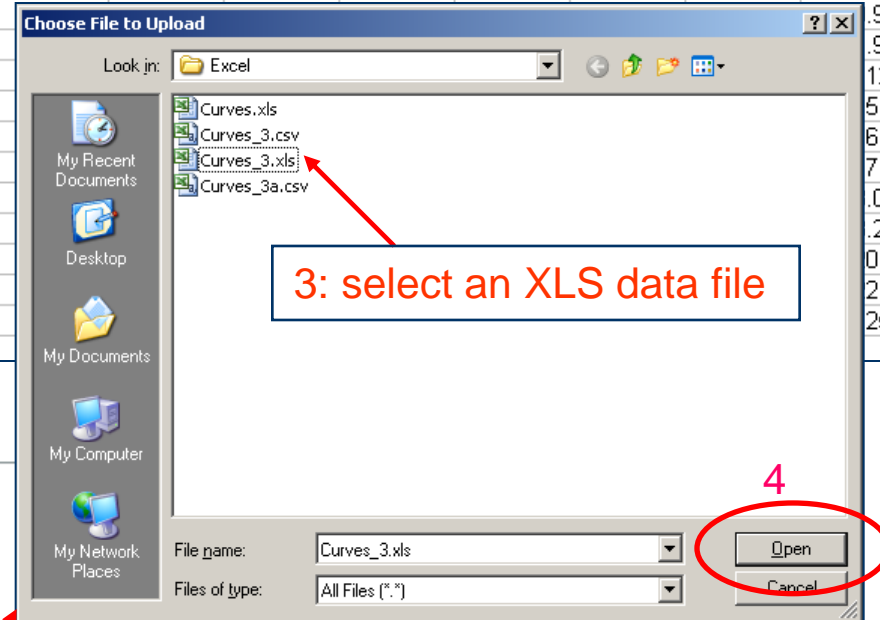
Step 1: Data

Step 2: Graph

Step 3: Options

x0	y0	x1	y1	x2	y2
1	1	1	3	1	2.54
2.2	4.84	1.3	3.9	2	5.08
3.3	10.89	2	6	2.7	6.858
4.4	19.36	2.6	7.8	3	7.62
5.5	30.25	3	9	3.1	7.874
6	36	3.2	9.6	3.4	8.636
7.5	56.25	4	12	3.8	9.652
8.8	77.44	4.8	14.4	4	10.16
9.5	90.25	5.1	15.3	4.3	10.922
10	100	6.11	18.33	4.7	11.938
		7.2	21.6	5	12.7
		8.3	24.9	6	15.24
		9.25	27.75	6.5	16.51
		10	30	7	17.78
				7.1	18.034
				7.2	18.288
				8	20.32
				9	22.86
				10	25.4

	A	B	C	D	E	F	G	H
1	x0	y0		x1	y1		x2	y2
2	1	1		1	3		1	2.54
3	2.2	4.84		1.3	3.9		2	5.08
4	3.3	10.89		2	6		2.7	6.858
5	4.4	19.36		2.6	7.8		3	7.62
6	5.5	30.25		3	9		3.1	7.874
7	6	36		3.2	9.6		3.4	8.636
8	7.5	56.25		4	12		3.8	9.652
9	8.8	77.44		4.8	14.4		4	10.16
10								10.922
11								11.938
12								12.7
13								15.24
14								16.51
15								17.78
16								18.034
17								18.288
18								20.32
19								22.86
20								25.4
21								



Curve interpolation:

- ☒ Linear
☐ Polynomial

Graphs

- ☐ Simple Curve Sample
☐ Log Log Sample
☐ webGraph Logo
☐ Multiple Curves Sample
☒ User defined

1

2

5

Please select an Excel data file:

Browse...

Upload Excel data file

Please select a configuration file:

Browse...

Upload Configuration

Show in Graph Tab

webGraph: the resulting Graph

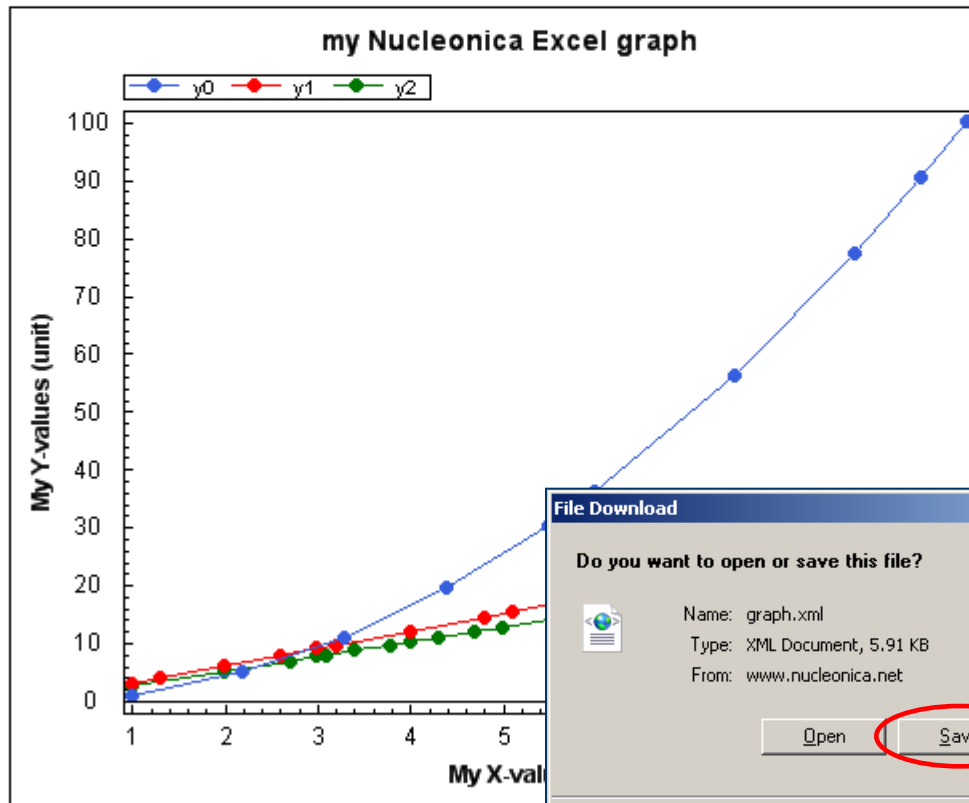


webGraph

Step 1: Data

Step 2: Graph

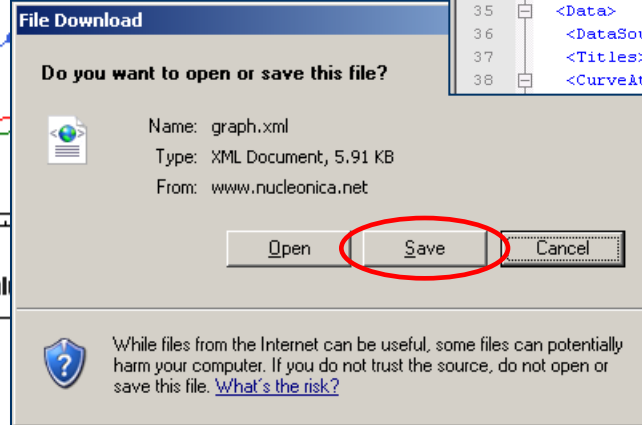
Step 3: Options



Graph formats: ☒ GIF ☐ JPG ☐ EMF

Save Image

Save Configuration



```
<?xml version="1.0" encoding="utf-16" ?>
<NucleonicaGraph>
  <Options>
    <ImageWidth>500</ImageWidth>
    <ImageHeight>400</ImageHeight>
    <LineStyle>LineWithSymbols</LineStyle>
    <Border>true</Border>
    <GraphBorder>true</GraphBorder>
    <Legend>true</Legend>
    <YAxisLog>false</YAxisLog>
    <YAxisMin>-1</YAxisMin>
    <YAxisMax>19</YAxisMax>
    <YAxisAuto>true</YAxisAuto>
    <XAxisLog>false</XAxisLog>
    <XAxisMin>-0.5</XAxisMin>
    <XAxisMax>9.5</XAxisMax>
    <XAxisAuto>true</XAxisAuto>
    <GraphTitle>my Nucleonica Excel graph</GraphTitle>
    <Category>
      <!--X-axis title-->My X-values
      <Value>
        <!--Y-axis title-->My Y-values
      </Value>
    </Category>
    <MajorGridlinesX>false</MajorGridlinesX>
    <MinorGridlinesX>false</MinorGridlinesX>
    <MajorGridlinesY>false</MajorGridlinesY>
    <MinorGridlinesY>false</MinorGridlinesY>
    <TicksLocation>1</TicksLocation>
    <MajorStepX>-1</MajorStepX>
    <MinorStepX>-1</MinorStepX>
    <AutoTickX>true</AutoTickX>
    <MajorStepY>-1</MajorStepY>
    <MinorStepY>-1</MinorStepY>
    <AutoTickY>true</AutoTickY>
    <CurveInterpolation>0</CurveInterpolation>
  </Options>
  <Data>
    <DataSource>2</DataSource>
    <Titles>y0,y1,y2</Titles>
    <CurveAttributes>
      <CurveNumber>1</CurveNumber>
      <Color>255, 65, 105, 225</Color>
      <Symbol>3</Symbol>
      <Filled>True</Filled>
      <SymbolSize>7</SymbolSize>
      <LineWidth>1</LineWidth>
      <LineStyle>0</LineStyle>
      <DashOn>2</DashOn>
      <DashOff>1</DashOff>
      <PointNumber>10</PointNumber>1,1,0;2,2,4.6
    </CurveAttributes>
    <CurveNumber>2</CurveNumber>
    <Color>255, 255, 0, 0</Color>
    <Symbol>3</Symbol>
    <Filled>True</Filled>
    <SymbolSize>7</SymbolSize>
    <LineWidth>1</LineWidth>
    <LineStyle>0</LineStyle>
    <DashOn>2</DashOn>
    <DashOff>1</DashOff>
    <PointNumber>14</PointNumber>1,3,0;1.3,3.9
    </CurveAttributes>
    <CurveNumber>3</CurveNumber>
    <Color>255, 0, 128, 0</Color>
    <Symbol>3</Symbol>
    <Filled>True</Filled>
    <SymbolSize>7</SymbolSize>
    <LineWidth>1</LineWidth>
    <LineStyle>0</LineStyle>
    <DashOn>2</DashOn>
    <DashOff>1</DashOff>
    <PointNumber>19</PointNumber>1,2.54,0;2,5.
    </CurveAttributes>
  </Data>
</NucleonicaGraph>
```

webGraph: Data from another Application

The screenshot displays the Nucleonica Scripting application interface. The main window is divided into several sections:

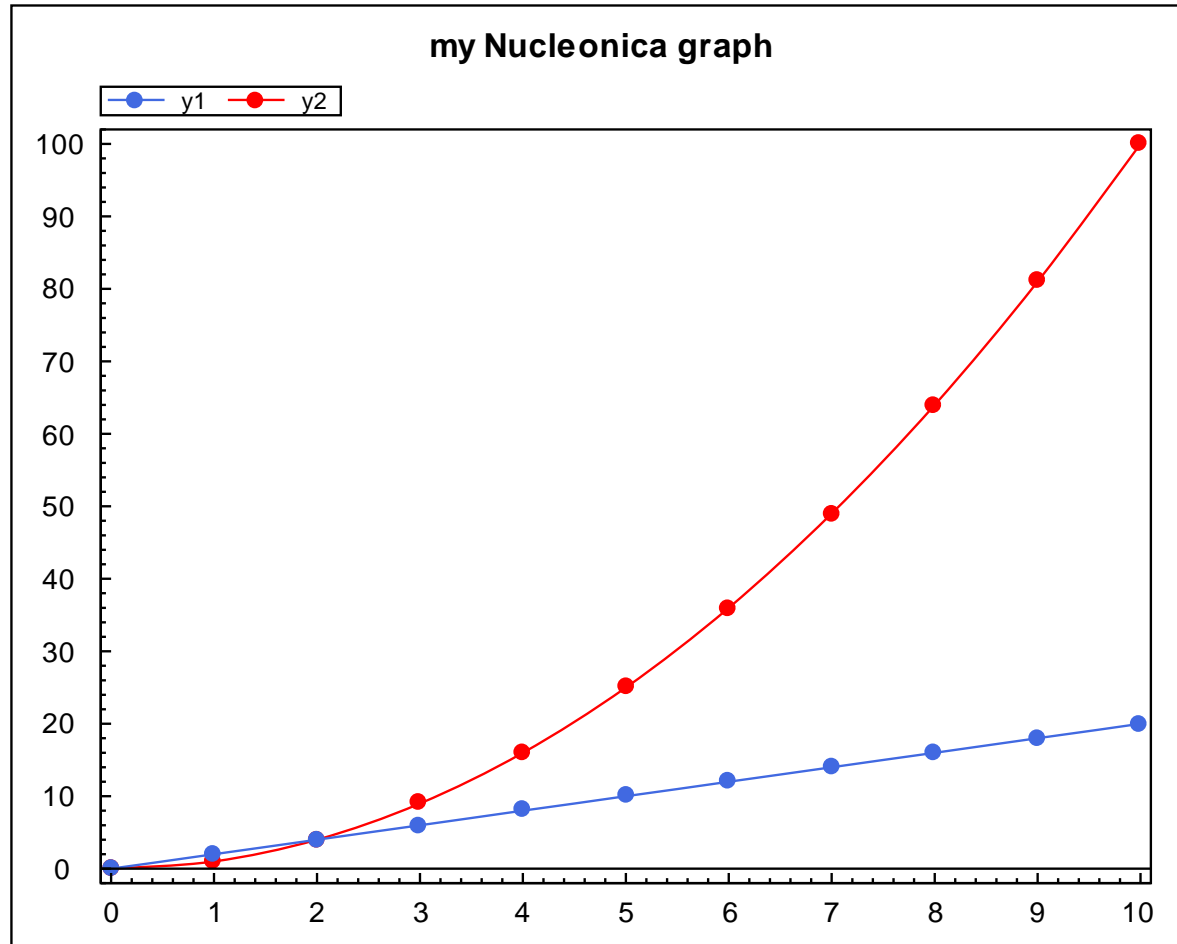
- Step 1: Data** (selected): A text area containing a list of coordinates (x, y1, y2):
0, 0, 0
1, 2, 1
2, 4, 4
3, 6, 9
4, 8, 16
5, 10, 25
6, 12, 36
7, 14, 49
8, 16, 64
9, 18, 81
10, 20, 100
- Step 2: Graph** (disabled): A section for graphing options.
- Step 3: Options** (disabled): A section for additional options.
- Source Editor** (selected): A section for editing scripts. It includes a **Note** about viewing HTML output and a **Script Output** tab. Below the tabs is a **Source** editor with the following code:

```
int main()
{
    print("x, y1, y2");
    double x;
    for(x=0; x<=10; x=x+1)
    {
        print(ToString(x) + ", " + ToString(2*x) + ", " + ToString(x*x));
    }
}
```
- Output** (selected): A section showing the output of the script, which matches the data in Step 1.
- Import File** (button): A button to import data from a file.
- Run** (button): A button to execute the script.
- Run in Background** (button): A button to run the script in the background.
- Command line arguments** (text input): A field for entering command line arguments.
- Curves** (text input): A field for entering curve names.
- Curve interpolation** (radio buttons):
 - ☐ Linear
 - ☒ Polynomial
- Graphs** (radio buttons):
 - ☐ Simple Curve Sample
 - ☐ Log Log Sample
 - ☐ webGraph Logo
 - ☐ Multiple Curves Sample
 - ☒ User defined
- Show in Graph Tab** (button): A button to display the graph.

A red arrow points from the **Output** section to the **Step 1: Data** section, labeled **Copy & Paste**. A blue box highlights the **Curves with the same X-values** text. A small graph window with a question mark is visible at the bottom.

webGraph: the resulting Graph

Downloaded as an EMF image



webGraph: Exercise

Exercise: Using Nucleonica's webGraph tool,

1.) Draw a graph with a curve given by the values from the grid:

x	0	1.0	2.0	3.0	4.0	5.0	6.0	7.0
y	0	3.1	5.9	8.1	9.5	10.0	9.5	8.1

2.) Add a graph title, set axis categories and units and show the major gridlines.

3.) Add a second curve (with different x-values) given by:

x	0.5	1.5	2.5	3.5	4.5	5.5	6.5	7.5
y	0	3.1	5.9	8.1	9.5	10.0	9.5	8.1

4.) Use polynomial interpolation, change the legend and remove line symbols.

5.) Save the configuration

webGraph: Solution

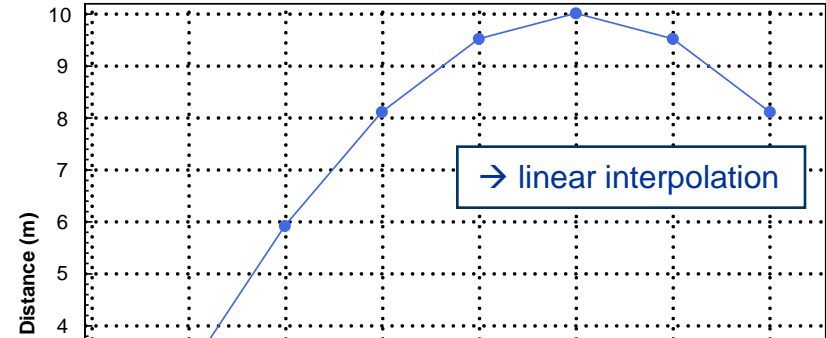
Step 1: Data

Step 2: Graph

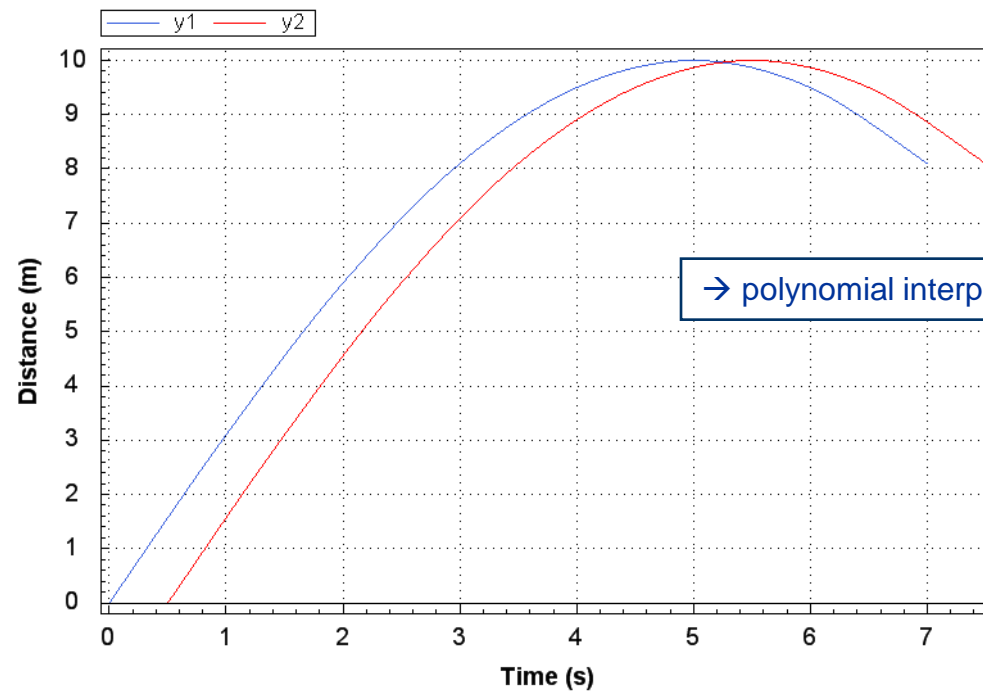
Step 3: Options

x	y1	x	y2
0	0.0	0.5	0.0
1	3.1	1.5	3.1
2	5.9	2.5	5.9
3	8.1	3.5	8.1
4	9.5	4.5	9.5
5	10.0	5.5	10.0
6	9.5	6.5	9.5
7	8.1	7.5	8.1

Exercise: steps 1 & 2



Exercise



Graph formats: ☒ GIF ☐ JPG ☐ EMF ☐ EPS ☐ PNG ☐ SVG

Save Image ☒ Save Configuration

1. webGraph overview

1. Data input
2. Graph settings
3. Up- and download data files
4. Download graph (Image format)



2. Exercise

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R. Dreher

Nucleonica GmbH